

ABSTRACT

a

A cable television (CTV) system having an ad-insertion apparatus for automatically inserting commercial segments into program material under the control of cue tones transmitted by the program source. The system includes apparatus for normalizing the audio signal levels of the program and commercial materials so that the audio portion of the output signal being transmitted to subscribers will have a relatively uniform loudness. The same concept may be applied to video signals. Additionally, signals coming from several channels may be normalized with respect to each other using the same technique. One aspect involves normalization of the audio level of the commercial, based on measured levels of the program audio preceding the advertisement. In other variations, the program audio level is adjusted to match ^{a preset audio level of an advertisement} ~~a preset ad audio level~~. In another aspect of the invention, the audio level adjustment is achieved by monitoring the deviation of an audio modulator. In general the technique comprises generating composite CTV output signals in each of a plurality of CTV channels by generating a series of program segments and cue tones indicating the borders of the program segments and a series of commercial segments in response to the cue tones. Each CTV channel output is formed by alternately linking program segments with commercial segments at the borders in response to the cue tones. The channel outputs are combined for simultaneous transmission to subscribers. The loudness of the segments in one of the CTV channels is monitored. Volume attenuators are adjusted in each of the channels as a

function of the loudness in one of the channels such that the loudness of the audio in the channels is normalized.